AMENDMENTS TO THE CLAIMS

Please cancel claims 1-20.

Please add the following new claims:

21. (new) A method of petrophysical evaluation of an earth formation using a logging tool conveyed in a borehole in said formation, the method comprising:

    (a) obtaining values of a horizontal and vertical resistivity of said earth formation using said logging tool; and

    (b) determining a horizontal and vertical permeability of said earth formation using said horizontal and vertical resistivities, said horizontal and vertical permeabilities having a ratio different from a ratio of said vertical and horizontal resistivities.

22. (new) The method of claim 21 wherein said earth formation comprises a sand component and a shale component.

23. (new) The method of claim 21 wherein determining said horizontal and vertical permeabilities further comprises determining a water content of said formation from said horizontal and vertical resistivities.

24. (new) The method of claim 23 wherein determining said horizontal and vertical permeabilities further comprises determining an estimate of bulk irreducible water

content of the formation from NMR measurements.

25. (new) The method of claim 23 wherein determining said water content of said formation further comprises:

(i) inverting said values of horizontal and vertical resistivities of the formation using a petrophysical model to give a first estimate of fractional volume of laminated shale in the formation;

(ii) obtaining measurements of density and/or neutron porosity of the formation and using a volumetric model for deriving therefrom a second estimate of fractional volume of laminated shale; and

(iii) if said second estimate of fractional shale volume is greater than said first estimate of fractional shale volume, inverting said horizontal and vertical resistivities using a petrophysical model including said second estimate of fractional shale volume and obtaining therefrom a water content of the formation.

26. (new) The method of claim 21 further comprising determining a vertical and horizontal resistivity of an anisotropic sand component of the formation, and determining therefrom and from at least one additional measurement selected from the group consisting of: (i) NMR measurements of the formation, and, (ii) a bulk permeability of the sand component, a parameter of interest of a coarse and a fine grain portion of the sand component.

27. (new) The method of claim 21 further comprising using a transverse induction logging tool for obtaining said values of horizontal and vertical resistivities of the formation.

28. (new) The method of claim 21 further comprising using an induction logging tool for obtaining said values of horizontal resistivities and a focused current logging tool for obtaining said values of vertical resistivities

29. (new) The method of claim 25 wherein using said volumetric model further comprises using at least one of: (i) the Thomas-Stieber model, and, (ii) the Waxman-Smits model.

30. (new) The method of claim 21 wherein further comprising determining a parameter of interest is selected from the group consisting of: (A) a fractional volume of said coarse grain component, (B) a fractional volume of said fine grain component, (C) a water saturation of said coarse grain component, (D) a water saturation of said fine grain component, (E) a permeability of said coarse grain component, and, (F) a permeability of said fine grain component.

31. (new) The method of claim 26 wherein the at least one additional measurement comprises an NMR measurement, and deriving the parameter of interest further

comprises deriving a distribution of relaxation times from said NMR measurements and obtaining therefrom a distribution of components of said anisotropic sand.

32. (new) The method of claim 26 wherein the at least one additional measurement comprises a bulk permeability measurement of the anisotropic sand and deriving the parameter of interest further comprises:

A. obtaining a family of possible distributions of volume fractions and bulk irreducible water content (BVI) for the coarse and fine sand components;

B. determining horizontal, vertical and bulk permeability values associated with said family of possible distributions; and

C. selecting from said family of possible distributions the one distribution that has a determined bulk permeability substantially equal to the measured bulk permeability.

33. (new) The method of claim 32 wherein said bulk permeability is obtained from the group consisting of (I) NMR diffusion measurements, (II) a formation testing instrument, (III) a pressure buildup test, and, (IV) a pressure drawdown test.

34. (new) The method of claim 32 wherein determining the horizontal and vertical permeability values associated with said family of distributions for the coarse and

fine sand components further comprises using the Coates-Timur equation

$$k = \left(\frac{\phi}{C}\right)^{a} \cdot \left(\frac{\phi - BVI}{BVI}\right)^{b}$$

where k is a permeability, ϕ is a porosity, BVI is the bound volume irreducible, and a, b, and C are fitting parameters.

35. (new) The method of claim 32 wherein determining horizontal, vertical and bulk permeability values further comprises using a relationship of the form

$$k = C\phi^{a}T^{b}$$

where k_e is a permeability, ϕ is a porosity and T is a NMR relaxation time, and a, b, and C are fitting parameters.

36. (new) The method of claim 35 wherein T is a longitudinal NMR relaxation time.

37. (new) The method of claim 32 wherein the coarse sand portion of the selected distribution is characterized by an irreducible water saturation less than an irreducible water saturation of the fine grain sand portion of the selected distribution.

38. (new) The method of claim 32 wherein the determined bulk permeability is a

spherical permeability related to the horizontal and vertical permeability values by a relationship of the form

$$k_{sph} = \left(k_h^2 k_v\right)^{\frac{1}{3}}.$$